back into prehistoric anthropology through the brief period of two centuries, the earth itself, the land that is still in process of exploitation, makes a very natural appeal. The Geological Survey in such countries takes the place of an Academy of Inscriptions, and now the laboured memoirs of the surveys are being condensed for students who are to take their stand as citizens. South Africa, Australia, and New Zealand, armed with such accurate knowledge, will soon offer little field for those spirited romanticists, the company promoters of the mining world.

(1) Prof. Schwarz, however, is himself romantic. He stands among the prophets, and is apt to perceive the sunburst where some of us still remain doubtful of the dawn. A touch of adventure is imparted to the present volume by his unhesitating acceptance of the very attractive planetesimal hypothesis, and of the far more dubious conclusions of Brun in the volcanic field. We are invited by him to a well-planned arena, where nineteenth-century champions may be seen rolling in the dust. Apart from this, he sets out very justly to teach elementary geology in South Africa by South African examples. His treatment is so sound that we resent the introduction of the European Zechstein and Kellaways series, and so forth, in the table following p. 124, however necessary these trifles may still be in examinations conducted on traditional lines.

The author starts in his preface with the fact that brooks are unknown to his students, and by p. 34 we have a description of boulder-streams after torrential rains, on p. 35 we talk of vleys and vloers, and on p. 64 we realise, from a modern subtropical instance, the origin of our own "crystalline sandstones." The African climate permeates such chapters, and we must not complain if the pumpkin-like *roches moutonnées* on p. 43 and the treatment of glaciation on pp. 40 to 44 appear to European minds defective. There are some slips in the writing which suggest haste, as when a bore-hole is stated (p. 54) to be 6000 ft. thick, and when melilite-basalt (p. 63) is described without mention of the mineral melilite.

In an account of heat-weathering, which is very properly emphasised on p. 71, we are told that the corners of a block expose a larger surface to the sun than the flat sides. The matter is better expressed in Prof. Marshall's "Geology of New Zealand" (p. 46). Prof. Schwarz concludes with an account of the stratified series in the South African provinces and in Rhodesia, illustrated by maps and drawings of fossils, and full of interest for European as well as African readers.

(2) Prof. Marshall's book, coming so soon after Prof. Park's larger treatise, reminds us at once of the stratigraphical controversies that still await settlement in New Zealand. Dwellers in the British Isles find it hard to comprehend the vast series of rocks in other lands that may be devoid of fossil evidence; but it is equally hard to comprehend why an unconformity should be demanded as a proof of the distinction between two successive geological systems. This seems the main point with those who, like Prof. Marshall, reject the view that the Waipara series is Cretaceous, and insist on giving us a Cainozoic group which begins with Cretaceous types of life (p. 197). An author who believes "that too much attention has been paid in the past to the palæontological evidence" seems to mark out his systems on older grounds than those put forward by William Smith.

The book is very well illustrated by photographs, and, like that of Prof. Schwarz, introduces students to geology by means of the features of the home-country in which they live. Glaciers and recent volcanoes are brought in as present witnesses, and the geographer and geologist in other lands will welcome this convenient and well-printed volume. One does not demand a full treatment of rocks or minerals in a book that has another and a special aim; but the chemical formulæ on pp. 12 to 20 require a good deal in the way of correction and punctuation.

(3) Mr. Süssmilch's book, also in the same convenient *format*, is issued by the Department of Public Instruction of New South Wales. It presupposes a knowledge of geological principles, and brings together a large amount of matter that is distributed through official reports. This treatment allows of greater detail than can be introduced into the volumes on South Africa and New Zealand. We find pleasure, however, in comparing the account of the Glossopteris flora (p. 91) or the Palæozoic glacial beds (pp. 61 and 96) with the remarks of Prof. Schwarz on similar occurrences in South Africa; and there is no doubt that the three books should stand near together in our libraries. Through its design, that on New South Wales is naturally the most informing.

G. A. J. C.

OUR BOOKSHELF.

The Twenty-Seven Lines upon the Cubic Surface. By Prof. A. Henderson. Pp. vi+100+13 plates. (Cambridge: University Press, 1911.) Price 4*s*. 6*d*. (Cambridge Tracts in Mathematical Physics. No. 13.)

THIS volume is a record of an individual attempt to construct numerical models of the cubic surface, founded on the lines of the surface; it is carried through with great earnestness, and so far as possible with the simplest materials; its obvious

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sincerity cannot fail to be inspiring to anyone who will be at pains to understand it. It would be a mistake to criticise the earlier half of the book as if it were a treatise on the cubic surface; it is the author's assembling of his materials for the constructions which follow, and the very want of elaboration which it occasionally exhibits is a proof, if an incidental one, of the independence with which the author has carried out his research. Perhaps the analytical investigation of the double-six theorem, which occupies pp. 16 to 19, is an extreme case; a geometrical proof might have been given, though the author's is simple and self-contained.

The book is accompanied by reproductions of elaborate diagrams, carefully drawn to scale. They would have been more interesting if not so much reduced in size. There is a long bibliography of the general literature in regard to the cubic surface, which is likely to be useful. Under 1902 there should certainly be the entry, "Beziehungen der allgemeinen Flache dritter Ordnung zu einer covarienten Flache dritter Classe," by Th. Reye, *Math. Annalen*, Bd. lv. Also the paper of G. Kohn, "Ueber einige Eigenschaften der allgemeinen Flache dritter Ordnung," *Wiener Sitzungsberichte*, Bd. cxvii., p. 66, should be referred to, and a recent paper by Prof. W. Burnside in the Camb. Phil. Proceedings, on double-sixes with projective transformations.

Medizinisch-chemisches Laboratoriums-Hilfsbuch. By Dr. Ludwig Pincussohn. Pp. xi+443. (Leipzig: F. C. W. Vogel, 1912.) Price 13.50 marks.

ONE cannot say that Dr. Pincussohn's book fulfils any real need, seeing that laboratory guides of the same nature are already numerous. The author was formerly assistant to Prof. Albderhalden, and is well known as an original worker in the field of physiological chemistry. The book he has produced is a very good one, and is specially useful because of the tables of physical and chemical data which occupy its last hundred pages. The introductory chapters deal with general chemical methods, and the remainder, as the title indicates, with that portion of the science which it is the fashion to call bio-chemistry. The analytical and other methods of research selected are up-to-date, and are described in a clear and interesting way. W. D. H.

Books that Count. A Dictionary of Standard Books. Edited by W. Forbes Gray. Pp. xx+315+lviii. (London: A. and C. Black, 1912.) Price 5*s*. net.

OF the fourteen sections into which this dictionary is divided, one deals with science, and some others are concerned with such kindred subjects as education, geography and travel, philosophy and sociology. The sections are necessarily incomplete, for the editor intends his lists chiefly for the use of young students and ordinary readers. The work should, however, be very valuable for reference to notable books in many departments of knowledge.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Luminous Halos surrounding Shadows of Heads.

THE phenomenon referred to in a note in NATURE of December 12 (p. 419), as observed in rice-fields of Japan, can also be seen on grass when the sun is low in the sky. The presence of dew, I believe, increases the intensity of the halo, but it is perfectly distinct also on dry grass.

If the grass surface is near to the observer, a faint halo is seen to surround the shadow of his head, and this is more easily perceived if he is moving than if standing still; my attention was indeed first attracted to the phenomenon when bicycling.

In this mountain region I have frequently seen the halo projected on a grassy slope a mile or more distant, and under these conditions it appears as a circular or elliptical patch of light without the central shadow, the diminution of intensity due to the penumbral shadow of one's head being, of course, quite inappreciable at such distances. It is difficult to determine the size or shape of this patch, owing to irregularities in the brightness of the background; but I have been able to compare it with the nearly full moon rising immediately above it, and should judge it to be at least 2° in diameter, and probably elliptical in shape with the long axis vertical. The light appears to emanate from the grass itself, which apparently reflects more light in the direction of incidence than in other directions; it is certainly not due to dust or haze in the intermediate column of air. I am unable to say whether a smooth rock surface would give the same appearance, but a dense white cloud certainly does so, with the addition of a faintly coloured ring surrounding the white patch. This I presume is allied to the "Brocken spectre," seen when the illuminated cloud or fog is near to the observer.

The analogy of this elliptical bright patch opposite the sun with the Gegenschein is so striking that one cannot help believing both to be due to the same cause, and that matter outside the earth's orbit and beyond the limits of the earth's shadow reflects more sunlight in the direction of incidence than in other directions. That the Gegenschein usually covers a much larger angular area than the 2° patch seen on these hills may be accounted for by the much more favourable conditions in which it is seen, with a dark and uniform sky-background. J. EVERSHED.

Kodaikanal Observatory, South India,
January 4.

EXACTLY a month ago to-day, in the Betul district, Central Provinces, I had set out on field work at dawn, with my colleague, Mr. H. Walker, and two chaprasis (Indian servants). I happened to be watching our shadows as we passed along the edge of a field of young green wheat, when, to my surprise, I noticed a halo of light round the shadow of my own head and neck. Looking at the other shadows, I was still more surprised to see that only my shadow was invested with this halo. I directed the attention of Mr. Walker and the chaprasis to the phenomenon, and found that each could see a halo round his own head only. Whilst we were investigating the matter our camp passed on the march, and inquiries made both from our servants and from local people showed

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